Art. XL.—*On New Australian and New Zealand Lichens.*

By James Stirton, M.D., F.L.S., &c.

Communicated by T. W. Naylor Beckett, F.L.S.

[*Read before the Philosophical Institute of Canterbury, 2nd June and 3rd November, 1897.*]

The materials for the determination of the lichens forming the subject of the present paper have been sent to me from time to time through a long series of years, ranging as far back as 1863, not long after my graduation. The first small parcel is memorable as containing two or three characteristic lichens sent by Mr. James Johnstone, a fellow-student in Edinburgh University, who died shortly after the despatch of his parcel. One lichen from him while in New Zealand is recorded here, to which I have appended his pet name of *kelica*—viz., *Lecidea kelica*. This lichen was first described by me in the "Transactions of the Glasgow Field Naturalists" for 1874; afterwards in the "Journal of the Linnæan Society" for 1876. Dr. Nylander, of Paris, published, in 1889, a description of the same lichen, under the name *Lecidea stillata*, Nyl.

Since the death of Mr. Johnstone I have had several correspondents in New Zealand and Australia, and notably Mr. John Buchanan, of the Museum, Wellington, who sent to me much the largest and most interesting collection of mosses, as well as lichens. The names of the others will be mentioned in connection with their several discoveries.

Before entering upon the description, in systematic order, of the entire collections, I shall give a synopsis of a group of lichens with red or rubricose apothecia, having characteristics in common, of sufficient importance to warrant my giving a new grouping of them under the generic name *Miltidea*, a name rendered conformable to *Lecidea*. This group of lichens, of which *Lecidea rubricatula* (Strn., Journ. Linn. Soc., 1876) may be reckoned the type, has engaged my attention for a considerable time. It is characterized, more particularly, by its members having a peculiarly constituted perithecium. By perithecium I mean a cup-like receptacle which surrounds (at the sides as well as the base) the hymenium proper, including under this term the hypothecium from which this receptacle is, more especially, distinct. This perithecium, in the group of lichens under discussion, is composed of rods or staffs set perpendicularly to the general surface of the thallus, and, of

course, in a line with (although beneath) the paraphyses and hypothecium. These staffs, whose thickness varies from 0·0025 mm. to 0·0045 mm. are generally roughish on the surface, and are, accordingly, pretty closely matted together. They are much more distinctly defined in the lower part of the receptacle or perithecium. Upwards, towards the sides, they become somewhat confused, and often degenerate into oblongish cells, and in a few instances are merely cellular and granular. The upper and, especially, the lower extremities of these rods are generally of a different colour from the rest, such as red, yellow, or citrine, as viewed under the microscope. In another group of lichens, described apart from the present one, the extremities are blue, or bluish-black, &c. As a rule, this perithecium is destitute of gelatine, as indicated by iodine, but contains abundance of chrysophanic acid, especially in the lower extremities. Meanwhile, for want of a better term, I shall call the lower and better-defined part of the perithecium the hypoperithecium, a term which sufficiently indicates its position. In two or three examples, such as *Lecidea rubricatula*, the upper extremities are also slightly coloured red, &c. Hence my mistake in calling the hypothecium of this lichen "*rufulum*."

The present group includes lichens with very differently constituted spores. These vary from simple through septate or locular up to muriform, all, however, colourless, or nearly so, so far as investigated.

I have always deprecated the tendency of various authors to constitute genera solely on the basis of the structure of the spores. This group, which it must be allowed is a very natural one, gives to the spores a secondary place of consideration.

I may be allowed at this stage to strengthen the basis of the present classification by quoting a tendency of another group to a divergence of the purely septate or loculate form of spores towards the muriform.

Lecanora punicea, with its two or three varieties, is a well-known tropical and subtropical lichen. Its allies in the more northern regions are *L. hæmatomma* and *L. ventosa*. About fourteen years ago Dr. George Watt sent me, amongst a vast collection of lichens from India and the Himalayas, a *Lecanora* from the latter region growing on twigs of *Rhododendron*, whose external characters were exactly those of *L. punicea*—viz., the red apothecia, with white border, &c. In this the septate blocks were broken up into muriform constituents. Its diagnosis is the following: *Lecanora wattii*, Strn. Thallus albidus, rugulosus; apothecia rosea, plana, margine thallino albo, prominulo, integro, nonnihil inflexo cincta; sporæ (4–8)næ, incolores, fusiformes, undulatæ vel

bis tortæ extremitatibus attenuatæ, medio expansæ, (15–25)-septatæ (septis præsertim mediis (2–4)-divisis), 0·065–0·1 mm. × 0·008–0·011 mm.; paraphyses graciles, nonnihil irregulares apicibus coccineis (K purpurascentibus, colore evanescente). Hypothecium incolor.

The spores show a tendency to become muriform even towards the extremities.

Several authors would constitute this the type of a new genus; but its evident close affinity to *L. punicea* shows sufficiently the absurdity of such a proceeding. The shape and general configuration of the spores are exactly those of this *Lecanora*, as well as the rest of the constitution of the hymenium, and, as indicated above, the external characters are identical. It is merely the breaking-up of the septate blocks into different particles that gives even the warrant to specific, but certainly not to generic, distinction.

I shall now enumerate the various lichens comprehended under this, to which I give the generic name *Miltidea*. As regards those members of it already described, I shall merely append some remarks on the different peculiarities that present themselves under each species. I shall begin with those species having simple colourless spores.

1. *Lecidea* (*Miltidea*) *cinnabarina*, Smrft.
2. *Lecidea* (*Miltidea*) *russula*, Ach.

There is very little otherwise to distinguish these two except the greater thickness of the spores of the latter.

3. *Lecidea (Miltidea) læta*, Strn.

Thallus albidus nonnihil granulosus, tenuis. Similis *L. cinnabarinæ* sed sporis longioribus, cylindraceis, 0·013–0·019 mm. × 0·003–0·0035 mm. The spores of *L. cinnabarina* are obtusely fusiform, and 0·008–0·01 × 0·002–0·003 mm. Tasmania (*Mrs. H. MacEwen*), 1892; on branches of trees.

Under *L. rubricatula* are several forms. One of these is *L. cinnabarodes*, Nyl. (Lich. N.Z., 1889). Nylander describes the thallus of his lichen as being "albidus opacus tenuissimus." With one exception this description does not tally with any condition of the thallus I have seen. The thallus as described by me in Journ. Linn. Soc., 1876, agrees much more nearly with the numerous specimens from New Zealand in my herbarium—viz, "griseo-pallescens crassus diffracto-areolatus." In this paper I have given the dimensions of the spores as rather too great. They may be described as 0·014–0·022 mm. × 0·007–0·011 mm. The dimension, 0·016 mm., there given is a misprint for 0·013. It is exceedingly difficult to get a specimen in this species having fully-developed spores.

One species has a peculiar thallus.

Miltidea subrutila, Strn.

Thallus pallide cervinus, tenuis, hinc inde discontinuus vel in lineis undulatis angustis percurrens. Sporæ, 0·011–0·013 mm. × 0·007–0·0085 mm.

Miltidea rutilescens, Strn.

Thallus albus tenuissimus indeterminatus; sporæ ovales, 0·011–0·014 mm. × 0·005–0·006 mm.; paraphyses vix ullæ distinctæ apicibus fulvo-rufis. Thalamium K purpurascens. Ad lignum decorticatum prope Wellington (*J. Buchanan*).

The staffs of the perithecium in this species are nearly as indistinct as the paraphyses, and neither are rendered more distinct by K.

The two following lichens are peculiar, and may be included under this group.

Miltidea venusta, Strn.

Thallus albidus vel pallescens tenuis K flavens. Apothecia fusco-rufa mediocria vix marginata dein convexula; sporæ 8næ simplices, incolores, ellipsoideæ, 0·01–0·015 mm. × 0·005–0·0065 mm.; paraphyses, distinctæ, creberriter granuloso-inspersæ. Hypothecium incolor. Iodo g.h. intense cærulescens. Hymenium K flavens. Hypoperithecium late flavidum K flavens vel etiam citrinum. New Zealand, prope Wellington (*J. Buchanan*).

Miltidea venustula, Strn.

Thallus griseo-rufescens vel obscure rufescens, crassiusculus, rimoso-diffractus, minute granulosus; sporæ, 0·016–0·022 mm. × 0·008–0·012 mm. Hypoperithecium flavens K citrinum sub microscopio visum. Apothecia cinnabarino-coccinea. New Zealand, prope Wellington (*J. Buchanan*).

Before concluding this section of the group I shall describe another, the diagnosis of which is imperfect, inasmuch as it is doubtful whether the spores are matured, although the apothecia appear fully developed.

Miltidea consanguinea, Strn.

Thallus albidus vel pallide lutescens, minute rimuloso-diffractus (K fl. dein rubens); apothecia mediocria rufo-rubricosa, plana, leviter marginata (K. purpurascentia); paraphyses haud discretæ, pallide rufescentes, apice rufæ; hypothecium fere incolor. Iodo g.h. intense cærulescens; sporæ 20–30 vel ultra in thecis saccatis, sphæricæ, 0·0025 mm. diam. Ad lignum decorticatum Australiæ (*Hugh Paton*).

In only one instance were the spores seen in a theca as given above. Throughout the field of the microscope such minute bodies thickly scattered are almost always seen.

From species with simple spores we pass on to those having loculi in single series. Of these the first in order is *Lecidea aureola*, Tuck. The spores are colourless, fusiform, (5–9)-locular, 0·022–0·032 mm. × 0·004–0·006 mm. The thallus is generally yellowish or reddish-orange, and is tinged purpur-ascent by K. I have not got this species from New Zealand or Australia, but only from Southern Africa, where it seems abundant.

Miltidea domingensis, Ach., is a very abundant tropical and subtropical species. The spores are elliptical, colourless, (6–10)-locular. The size of the spores varies very considerably according to climate and number in each theca. This number ranges from 2 to 8. Mostly, however, the number varies from 2 to 4, and the average size may be stated as 0·03–0·04 mm. × 0·009–0·012 mm.

Miltidea vulpina, Tuck.—The only difference between this and *M. domingensis* is the breaking-up of the loculi of the spores into particles, so as to render them muriform, and the more constant reduction of the number of spores in each theca—viz., from 2 to 4, though I have seen as many as 6.

As showing the close relationship of the two preceding lichens, I have a specimen from near Brisbane, Queensland, sent by Mr. F. M. Bailey, of the Museum there. In this may be seen in the same apothecium thecæ containing simple loculate spores as in *M. domingensis*, and in others a mixture of both kinds; while in some all the spores are muriform. This is another instance of the futility of founding genera on the constitution of the spores. The average size of the spores in this species is 0·032–0·045 mm. × 0·011–0·015 mm.

Lecidea bifera, Nyl., and *L. parabola*, Nyl., from New Caledonia, belong, in all likelihood, to the group of which *R. vulpina* is the type, but, as I have not seen specimens of either, the matter must lie in abeyance.

Lecidea leucoxantha, Spr., and *L. fuscolutea*, Dicks., belong to the present group. The former is mainly distinguished from the latter by the border being paler than the disc of the apothecium, as well as in the much finer particles into which the muriform contents of the spores are divided; whereas in the latter the border is of a uniform colour with the disc, or at times a little darker, and the spores are coarsely divided.

The New Zealand specimens of *L. leucoxantha* have facies of their own, the thallus being nearly always pale-cervine or rufescent-cervine and roughish.

I have two rather peculiar forms of *M. leucoxantha*, both from tropical and Southern Africa, where the disc of the apothecium is pale-green or dingy-green pruinose. The thallus is pale or pallido-glaucescent, thin, much the same as in

normal specimens from Texas. This form may be called "var. *chloroxantha*, Strn."

Very probably several other lichens may be included in this genus.

From Victoria, in Western Tropical Africa, I have a lichen which has been referred to *Lecidea chloritis*, Tuck. The thallus, which is pale-glaucescent, has not, however, the tubercles scattered over it, of a yellow colour within, as Tuckermann states with regard to his species, but they are white within. As the name *chloritis* is scarcely apposite in this instance, perhaps it should be characterized by a separate name, as *L. endolencitis*.

In this lichen the hypoperithecium especially has somewhat undulated staffs tipped a deep-blue colour. A thin section of an apothecium shows a wine-coloured stratum at their upper extremities when viewed through a magnifying lens. Here also there is a close relationship of structure with the members of the first section just described, but the colour is different, and as there is no visible reaction by means of K on this lower blue colour there is, in all likelihood, a different chemical constitution. I observe also that New Zealand specimens of *Lecidea grossa* show an almost identical organization within with *L. chloritis*. These two, and very probably others, may well constitute a subsection of *Miltidea*, which may be distinguished by the name of *Cyanopsis*.

Before proceeding to describe in systematic order the rest of the collections it might be as well, for the sake of reference, to enumerate the various papers I have written on New Zealand and Australian lichens: Three papers in Trans. Glasgow Field Naturalists, for 1873, 1875, 1876; Journ. Linn. Soc., 1876; Trans. Glasgow Phil. Soc., 1877; Journ. Royal Soc., Victoria, 1880; "Scottish Naturalist," 1877 and succeeding years. With several exceptions, I have omitted to describe anew those lichens a diagnosis of which had already been given in the various papers enumerated above. The exceptions are instances where additional information is reckoned necessary, or where the original papers are now less accessible.

Calycidium cuneatum, Strn., Trans. Glasgow Phil. Soc., 1877; Chatham Islands (*Travers*).

This lichen is identical with *Coniophyllum colensoi* (Müll. Arg.), first described by the late Professor J. Müller (1892) in a paper on Dr. Knight's New Zealand lichens.

Usnea florida (L.), Fr.

Rather common in New Zealand.

Usnea xanthophana, Strn. "Scottish Naturalist," 1883.

Similis *U. floridæ* et similiter ramosa, sed gracilior et magis

elongata, et differt colore ochroleuco, thallo lævigato (K−, C flavente); axis pallidus, mediocris; fibrillæ medullares compactæ K−; I−. Sat frequenter apud montem Tararua, N.Z. (*J. Buchanan*), Akaroa Heads (*T. W. N. Beckett*).

I have been tempted to separate the New Zealand plant from that of the Northern Hemisphere, owing to the striking contrast in colour and appearance.

Usnea subfloridana, Strn. Scot. Nat., 1882.

Similis omnino *U. floridæ* sed fibrillæ medullares K flaventes, I−. Soredia K flaventia. New Zealand (*J. Buchanan*).

Usnea acromelana, Strn.

Similis *U. floridæ* vel potius *U. perplexanti*, Strn., sed minute et creberriter obscure vel nigro-articulata vel annulata, apicibus ramulorum frequenter nigris vel maculatim nigris. Axis crassus pallidus, K extus et intus flavens dein rubens vel sanguineus, I−.

This lichen bears a considerable resemblance to *Neuropogon melaxanthus* (found also in New Zealand), but the axis is pale and continuously solid, while that of the latter, especially in the main stems, is slightly fuscescent, and has lacunæ throughout, and often an irregular central canal. Selwyn Gorge, Canterbury, N.Z. (*T. W. N. Beckett*).

There is another *Usnea* from Mount Wellington, Tasmania, gathered by Mr. W. S. Campbell, which partakes of the characters of *U. xanthophana* and *Neuropogon*, but I shall meanwhile, in the absence of fructification, refer it to *Usnea chlorotella*.

Usnea lutescens, Strn.

Thallus rigidus, erectus, flavens vel interdum aurantiaco-flavens, ramosus sicut in *U. floridæ*, basi niger, supra sæpe tenuiter annulatim niger, apicibus concolor non denigratus; axis crassus, corneus, pallidus vel versus basin leviter fuscescens; fibrillæ medullares compactæ, albidæ, K−C−. Thallus extus K−C flavens.

The axis is solid and very tough, but not hollow.

Usnea perplexans, Strn. Scot. Nat., 1881.

Similis fere *U. floridæ* sed rigidior et magis sorediata. Axis crassulus, densus, pallidus; fibrillæ medullares albidæ densæ. K flav. dein rubentes. Prope Wellington, N.Z. (*J. Buchanan*).

Usnea constrictula, Strn. Scot. Nat., 1881.

Thallus pallide cinereo-glaucescens vel (N.Z.) pallide lutescens, rigidiusculus, erectus, basi crassiusculus, opacus, ramosus et ramulosus, ramulis plerumque divaricatis et sorediosis,

articulatus et ibi constrictus sed non inflatus; axis centralis pergracilis; fibrillæ medullares, arachnoideæ, K flav. dein rubentes, I violascentes; soredia K—. Tararua, N.Z. (*J. Buchanan*); Insula Regis (*E. Spong*).

Usnea mollis, Strn. Scot. Nat., 1881.

Thallus pallide cinereo-glaucescens, basi crassiusculus, erectus, ramosus ut in præcedente sed ramulis longioribus; axis centralis gracilis; fibrillæ medullares K—, I—; soredia K—. Tararua, N.Z. (*J. Buchanan*).

This lichen presents a rare exception to the rule—viz., "Soredia K flaventia."

Usnea subsordida, Strn. Scot. Nat., 1881.

Similis *U. ceratinæ*, erecta, rigida, thallo sæpissime obscuriore (cervino) et apotheciis pallidis vel pallide glaucescentibus, majusculis; sporæ,, 0·01–0·014 mm. × 0·007–0·0095 mm. Axis centralis gracilis; fibrillæ medullares K fl. dein rubentes. In Himalaya (*Dr. G. Watt*).

Usnea subsordida, * *tenebrosa*, Strn.

Thallus obscurior, luridus vel fusco-luridus vix papilloso-asper; apothecia parviora, albida vel cæsio-pruinosa, receptaculo thallino longe radiato-fabrilloso, fabrillis sæpe ramosis; sporæ parviores, 0·009–0·011 mm. × 0·006–0·007 mm. Axis gracilis sæpe rufescens, præsertim infra et fibrillis medullaribus arachnoideis. Prope Brisbane, Queensland (*F. M. Bailey*).

Usnea sublurida, Strn. Scot. Nat., 1881.

Similis *U. floridæ* sed densior, dendritico-ramosa, stipitibus et ramis rubigineis, at ramulis cinereo-glaucescentibus vel cenereis, creberriter sed minute sorediosis; axis crassus, pallidus; fibrillæ medullares albidæ, compactæ, K flaventes, I cærulescentes. Prope Brisbane, Queensland (*F. M. Bailey*).

Usnea pectinata, Strn. Scot. Nat., 1883.

Thallus pallidus, pallide ochroleucus vel glaucescenti-pallidus, rigidus, erectus (altit. 0·5–2 pollicum), acute et parce ramosus, densissime et rigide ramulosus fere pectinatus. Axis crassus, densus; fibrillæ medullares K—C—; I—. Thallus extus K—C bene flavens. Apud montes Grampian Victoriæ (*Sullivan*).

Usnea spilota, Strn. Scot. Nat., 1882.

Thallus rigidus, erectus vel prostratus, varie ramosus, non vel vix fibrilloso-strigosus, minute et prominule sorediosus, maculatim rufus vel rufo-rubigineus; axis crassus, pallidus; fibrillæ medullares albæ, firmæ, K flav. dein rubentes; I fibrillæ versus axin violaceæ. Insula Regis Australiæ (*E. Spong*).

Usnea rubescens, Strn. Scot. Nat., 1883.

Similis *U. floridæ* et similiter ramosa sed elongata et pendula vel prostrata (longit. interdum pedalis). Thallus cinerascenti-pallidus, sæpius minute papilloso-sorediatus, passim rufo-ferrugineus. Axis mediocris vel crassus, intus K passim rubro-maculatus; fibrillæ medullares albidæ, compactæ I—, K fl. dein rubentes. Ad rupes in New South Wales Australiæ (*Kirton*); in Insula Regis (*Müller*); Wellington (*J. Buchanan*); Victoria (*Bulli*).

This lichen tends to merge throughout into a rufo-ferrugineous colour, especially after being retained for a time in the herbarium.

Usnea rubescens, * *subrubescens*, Strn.

Similis *U. rubescenti* sed trunci et rami non vel vix fibrilloso-ciliati; axis pallidus, crassiusculus; fibrillæ medullares compactæ, albidæ, K— sed eæ axin versus K flaventes. N.Z. (*J. Buchanan*).

Usnea elegans, Strn. Trans. Royal Soc. Victoria, 1880.

Thallus (K—C—vel pallide flav.) pallide flavescens, teres, firmus, erectus (altit. 1–2-pollicaris), parcissime divisus, interdum simplex et tunc rigidus, undique densissime et breviter fibrillosus; axis gracilis, interdum filiformis; fibrillæ medullares arachnoidæ K—C—; apothecia pallida et cæsio-pruinosa, plerumque terminalia, plana (latit. 4–13 mm.), receptaculo thallino fibrilloso præsertim margine; sporæ 8næ, incolores, ellipsoideæ vel late ellipsoideæ, simplices, 0·008–0·011 mm. × 0·006—0·008 mm. Iodo gel. hym. intense cærulescens. Corticola, Girorie Mts., Darling Downs (*F. M. Bailey*); Canal Brook Australiæ (*Hartman*).

Usnea consimilis, Strn. Scot. Nat., 1882.

Similis præcedenti sed humilior, magis compacta ramis arcuatis et crebrius breviusque fibrilloso-ciliatis; axis centralis nonnihil crassior et fibrillæ medullares K fl. C fl. Sporæ 0·009–0·011 mm. × 0·006–0·007 mm. In Australia (*Rev. M. Anderson*).

Usnea oncodes, Strn. Scot. Nat., 1881.

Thallus lutescens aut lutescenti-cervinus vel etiam rufescens, nitidus, rigidus, crassiusculus, erectus, ramosus, ramis et ramulis prominule et creberriter cæsio-sorediosis; axis centralis filiformis; fibrillæ medullares K fl. dein ferrugineo-rubentes, I violaceæ. New Zealand (*J. Buchanan*).

The thallus has the smooth aspect of *U. articulata*, and, at times, slightly inflated.

Usnea molliuscula, Strn. Scot. Nat., 1883.

Similis *U. ceratinæ* sed parcius papilloso-aspera, flavescens vel sordide flavescens; axis gracilis pallidus; fibrillæ medullares arachnoideæ K – C –. Discus apotheciorum albidus, leviter cæsio-pruinosus, K – C flavens. In Victoria Australiæ, haud rara (*McCann*).

Usnea chætophora, Strn. Scot. Nat., 1882.

Similis *U. plicatæ* et longit. interdum sesquipedalis, sed fibrillæ medullares K fl. dein aurantiaco-rubentes vel etiam rubentes. Axis mediocris, pallidus; fibrillæ medullares minus compactæ interdum fere arachnoideæ. Ben Lawers Scotiæ, etc.

Usnea chætophora, * *propinqua*, Strn. Scot. Nat., 1883.

Similis typo sed robustior, crassior et minus ramosa, sæpius creberriter et minute albo-sorediata; soredia K fl. dein rubentia. Thallus pallescens ad flavescentem mergens. In Victoria Australiæ a *Cl. H. Paton* lecta.

Usnea longissima, Ach.

Found in various localities in Australia, Queensland, and New Zealand.

Usnea himantodes, Strn. Scot. Nat., 1883.

Similis *U. longissimæ* sed truncis et ramis primariis lævigatis, teretibus, sed hinc inde articulatis et longius parciusque fibrillosis. Thallus ochroleucus vel pallide cinerascens, firmior, rigidior, pendulus, elongatus (pedalis et ultra). Axis crassus (ut in *U. longissima*), fuscescens I – ; fibrillæ medullares parcæ, condensatæ K flaventes, I cærulescentes. Corticola in New South Wales (*Kirton*).

A very characteristic lichen. The reactions by iodine differ entirely from those by the same reagent on *U. longissima*, inasmuch as the axis is not affected, while the medullary fibres (which are scanty) are rendered by it an intense blue, then violascent.

Usnea torquescens, Strn. Scot. Nat., 1883, sub nomine *U. undulata*, Strn.

Thallus pallescens vel ochroleucus, undulatus, pendulus vel prostratus, elongatus (pedalis et ultra). Similis *U. longissimæ* et similiter fibrilloso- et divaricato-ramulosa, sed trunci et rami primarii angulati et spiraliter costati, sed non evidenter vel tantum obsolete articulati. Axis crassus pallidus I – ; fibrillæ medullares I –, K fl. dein rubentes. Adrupes in New South Wales Australiæ (*Kirton*).

Another very distinct lichen, having also affinities to

U. longissima, but differing, as may be observed, in various respects.

Cladonia retipora, Flk., * *arcuata*, Strn. Scot. Nat., 1885.

Podetia albida vel pallida vel (præsertim subtus) fulvescentia, rigida, conferta, erecta vel procumbentia (alt. circiter 30 mm.), cylindrica, arcuato- vel sinuoso-divisa et ramosa, reticulato-terebrata (K fl. C fl. vel intensius tincta). In Victoria Australiæ (*Falck*).

The habit is peculiar, and altogether different from *retipora*. The divisions of the stems, primary and secondary, are all arcuate, almost semicircular, and very rigid as well as brittle, the whole constituting an almost coralloid tuft.

Ricasolia beckettii, Strn.

Thallus crassus, firmus, cervinus vel rufo-cervinus et marginem versus lurido-cervinus, amplus (latile fere pedalis), laciniato-lobatus, laciniis hinc inde imbricatis, marginibus sinuato-incisis et crenatis, spermogoniis semilobatis, prominulis instructus; subtus luridus vel nigricans, tomento rhizineo fere vellereo præsertim versus marginem, etiamque rhizinis pallidis fasciculatis longis præditus; cyphellis pallidis veris fundo nonnihil farinoso adspersus; apothecia sparsa, rufa (latit. 1–3 mm.), receptaculo thallino, extus rugosulo et margine crenulato, demum fere integro cincta; sporæ 8næ, incolores, fusiformes, 3-septatæ, 0·03–0·038 mm. × 0·008–0·013 mm. Gonidia flavescentia; diam. 0·008–0·017 mm. Medulla albida, K – C –. Corticola, Banks Peninsula, New Zealand, a *T. W. N. Beckett* lecta.

This lichen is allied to *Ricasolia wrightii*, Tuck., but is distinct in the spores, thelotremoid cyphellæ, &c. It has been named in honour of Mr. T. W. Naylor Beckett, Fendalton, Christchurch, who has sent me recently some very interesting specimens from Banks Peninsula. Mr. Beckett has also sent two parcels of another *Ricasolia*, which I can only refer to *R. beckettii*, as varieties, or at most as sub-species.

Ricasolia beckettii, Strn., * *consentiens*, Strn.

Thallus tenuior, adpressus, pallidus vel pallide glaucescens, ad rufescentem hinc inde mergens, mediocris (latit. (3–6)-pollicaris), lævis, laciniato-lobatus, lobis interdum imbricatis, sinuato-divisis et crenatis, subtus pallidus, versus centrum fuscescens; apothecia carneo-lute sparsa, margine thallino fere integro cincta. Cætera ut in *R. beckettii*. Corticola, Banks Peninsula (*T. W. N. Beckett*).

Ricasolia asperula, Strn. Trans. Phil. Soc. Glasgow, 1877.

This lichen has very often glomeruli, composed of narrow lacinuli scattered pretty thickly over its upper surface. This

is, in all likelihood, what Babington calls *R. glomulifera*, Light. It is, however, quite distinct from it. The breadth of the spores is not quite so much as stated in the paper. I find the dimensions expressed by the formula 0·03–0·042 mm. × 0·005–0·008 mm. Medulla pale, K – C pale-red. Gonidia flavescent; diam. 0·005–0·008 mm.

I possess a very curious variety of *R. montagnei*, Bab. Thallus lurido-cervinus vel lurido-fuscescens, ad nigricantem mergens, corrugatulus, subtus nigricans, fere undique minutissime et brevissime nigro-tomentellus, et pseudo-cyphellis minutis, albidis prominulis creberriter adspersus; medulla alba vel albida K flavens. Sporæ fuscæ, fusiformi-ellipsoidæ, 1-septatæ, interdum polari-biloculares, 0·022–0·028 mm. × 0·008–0·01 mm.

Apices of paraphyses often fusco-clavate, and rendered violaceous by K. Spermogonia situated in small prominences with blackish osteoles. Corticola, near Wellington, New Zealand (*J. Buchanan*).

This form may meanwhile at least be distinguished by the name *Ricasolia luridescens*, Strn. I see the hypothecium is often fulvescent. Perhaps this colour is owing to age.

Note.—The type specimens of the New Zealand species named by Dr. Stirton have been deposited in the herbarium of the Canterbury Museum.—J. W. Naylor Beckett.

Art. XLI.—*A New Classification of the Genus* Pyxine.

By James Stirton, M.D., F.L.S.

Communicated by T. W. Naylor Beckett, F.L.S.

[*Read before the Philosophical Institute of Canterbury, 3rd November, 1897.*]

The genus *Pyxine*, the species of which are so widely distributed throughout tropical and subtropical countries, is a very perplexing one, inasmuch as there is apparently an interchange of characters amongst the seven or eight species constituting it. The different elements for the discrimination of these species are—First, the appearances presented by the medulla—viz., white, pale-yellow through orange, and orange-red to coccineous; second, the constitution and size of the spores; third, the colour of the upper surface of the thallus; fourth, the presence or absence of soredia; fifth, the chemical reactions by K—*i.e.*, *liquor potassæ*—on the thallus and